

STREET AND CITY MAINTENANCE PROBLEMS

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The subject assigned to me, "Maintenance of Streets and Roads" is one that has caused all of us a lot of worry. There would be a solution to it as far as city and county officials are concerned if, by some hook or crook, we could get the State Highway Department to take over the maintenance of all our streets and roads.

As this discussion will be more or less of a technical nature, I believe it would be proper to start it off with a chemist's analysis of woman, "Symbol — WO. Accepted atomic weight — 120. Physical properties — Boils at nothing and freezes at any minute. Melts when properly treated, very bitter if not well used. Occurrence — Found wherever man exists. Chemical properties — Possesses great affinity for gold, silver, platinum and precious stones. Violent reaction if left alone. Able to absorb large amounts of food matter. Test — Turns green when placed beside a better looking specimen. Uses — Highly ornamental, useful as a tonic in acceleration of low spirits and an equalizer of wealth. Is probably the most effective income-reducing agent known. Caution — Highly explosive in inexperienced hands."

Now that we are in the right frame of mind we can begin to get into our subject. However, before starting I would like to make this statement for the record. Due to all of the investigations going on at the present time, I would like for it to be understood that no influence of any kind has been exerted by either Mr. Palmore or Mr. Art Snyder on me in preparing this paper. The reason for this statement will be understood as we get further into the subject.

The chairman, in arranging this program, advised me that I would have to be very brief in my remarks and not to use more than two hours. Which reminds me of the story I heard about the Indians. You know how we are. When we meet someone on the street we go into a lengthy discussion concerning the weather, etc., while the Indians just grunt, in greeting we shake hands and talk a little bit while an Indian just raises his hand and says, "how." After the last war a young Indian brave was returning to his village after being away for 4 years and as he approached his wigwam he noticed how clean and nice it was around it and his squaw came out and approached him and he noticed that she had a papoose on her back and he got to thinking that he had been away for 4 years and as she approached and raised her hand and said, "how" in greeting, he raised his hand and said "who?"

Now to get down to the more serious subject. My opinion on maintenance of city streets as well as our roads is predicated on good drainage as well as staple base.

Maintenance is the art of keeping the pavement at its maximum utility with a minimum expenditure in money and inconvenience to traffic. When, through average wear or increased traffic load, such maintenance becomes greater than the amortization charges on a new pavement, complete resurfacing becomes desirable.

The distinction between maintenance and resurfacing is not always clearly marked because with certain types of surface, particularly the low cost ones, intelligent maintenance contributes to increasing ability to take traffic through increasing thickness and the stretching of areas which may have been overlooked in the original construction. In a strict sense, however, maintenance means keeping the pavement in approximately the same condition as originally constructed and the items generally include patching, filling cracks and light surface renewal treatments of less than $\frac{1}{4}$ gallon per square yard. No pavement ever has been devised that does not require maintenance.

On one of my recent trips to the Highway Department in Frankfurt, I was agreeably surprised to hear a discussion by highway officials on taking into consideration maintenance when new roads or streets are originally designed. This could be of great help to all maintenance crews.

In no situation does the adage of a "a stitch in time" apply more truly than in the maintenance of outdoor surfaces because deterioration is accelerated greatly once an area has broken so as to permit entry of water to subgrade. A good organization able to repair small breaks promptly will have much to do with keeping down expenditures. In city operations surface maintenance is divided into two classes, general maintenance consisting of major items of repair which are accomplished usually in the spring, and routine maintenance which consists of the repair of small surface breaks and drainage failures. General maintenance usually requires large equipment and is best accomplished by gang operation. Routine maintenance is carried on with smaller crews and under, sometimes, a patrol system where one or two men carry on through the year.

The time of year when work is accomplished has considerable bearing upon procedure, particularly on patch operations. Thus, in summer even a coarse textured patch will gradually set in place in traffic and warm sunshine, whereas, in winter it would be whipped out in a day or two.

Particular care should be taken, therefore, in cold weather to insure absolute bond with the old pavement and to seal the surface of the patch with fine aggregate. Often it may be desirable to substitute a medium curing cut back asphalt in place of rapid curing cut back asphalt. The softer asphalt residue will be more pliable for winter work and yet with the subsequent warm weather will have set sufficiently to maintain stability even with macadam aggregate.

In the past few years several of our city engineers have set up a program of surface sealing of streets for protection to the surface through the winter season. As a rule, we use about $\frac{1}{4}$ gallon of oil to 20 pounds of chips per square yard. This, of course, is primarily for the purpose of winter protection and saved the cities quite a lot of money during the past winter. Without this sealing coat as protection, the severe winter we have just gone through would have probably damaged miles of streets.

While treatments of this nature are very helpful it should be used only on streets that will eventually have to have a new surface entirely. The trouble that we would run into with treatments of this nature is getting the crown of our street out of shape and also if it is continually used to build up so high that it will be above our drainage. A good practice to use in treatments of this nature would be to check the street for pot holes and depressions and take some of the oil and chips and make up a cold patch and use as a kind of leveling course as well as to fill up the pot holes.

As very few cities have their own distributors, I have appealed to the county judge and fiscal courts for the use of their equipment and men during the time that they would not be using them. I am happy to state that the county officials have been most cooperative in helping us in this manner.

The 1950 session of the General Assembly of Kentucky passed a law which, incidentally, was sponsored by the Kentucky Municipal League and the Kentucky Professional Engineers, which changed the old law of making street improvements of a permanent nature by property assessment. Several cities are now taking advantage of this and those who are not familiar with the new law it might be well to study same as it was very carefully prepared and can be of great help to all cities, with the exception of Louisville, in constructing permanent streets and appurtenances. At the last conference of Kentucky Municipal League a resolution was passed to ask the Governor and the Highway Department to establish an urban engineer which would be similar to the highway engineer and the rural engineer. If this

could be done, I am of the opinion that it would be a great help to the city engineers where the Highway Department is constructing a new street or highway through a city.

Drainage is one of the biggest problems confronting us in street construction and maintenance. This is due, in part, to the fact that our streets were laid out and designed without the proper consideration having been given to drainage. Subdivisions are developed, streets are extended which increases, of course, the drainage problem. It is my opinion that in designing drainage for city streets consideration should be given not only to the natural water shed, but to the ultimate development of the territory which would increase the drainage problem due to the construction of residences or industrial buildings which, with the accumulation of the roof drainage, greatly increases the amount of water that would have to be taken care of.

Another problem that faces us is on cross drainage where we do not have sufficient head room to get the coverage for pipe. In a lot of cases our terrain is so flat that catch basins cannot be lowered to sufficient depth to take care of the cross drainage and in cases such as this it might be advisable to check up on using elliptical pipe. This would allow more coverage and would give the same area for drainage. In patrolling our streets, we keep a sharp lookout for edge raveling and also for weak places wherever they may occur. And in either winter or summer we try to take care of this condition in order to avoid the breakdown of larger areas of our pavement due to water getting under the surface material. Even in our city streets we find springs which have to be taken care of in the same manner as we do on our rural and main highways.

Again, I would like to stress the importance of having good drainage and good subgrades for any or all types of surface material. Good drainage will save thousands of dollars in maintenance.